

Adding an implementation phase to the framework for flood policy evolution: insights from South Africa

Brendon Solik and Edmund C. Penning-Rowsell

School of Geography and the Environment

University of Oxford, South Parks Road, Oxford OX1 3QY

Author's bio

Professor EDMUND PENNING-ROWSELL is a geographer, taking his PhD from University College London. His research interests are the political economy of major hazards and how this affects decisions about investment in hazard mitigation. He has more than 40 years' experience of research and teaching in the flood hazard field. His focus is on the economic and social impact of floods, and the policy response from regional, national and international organisations. He was awarded the O.B.E. by the Queen in May 2006 for services to flood risk management.

Mr BRENDON SOLIK has been an MSc student at OUCE, Oxford University.

Abstract

South African flood risk management policy changed radically after the end of apartheid (1994), with the Disaster Management Act 2002 promoting a modern proactive approach. However our policy document research and two case studies show an implementation deficit. The pre-existing 'crises and catalysts' theoretical framework we used for analysing flood policy evolution needs more attention to implementation issues, and the learning involved. Future flood policy change in South Africa or elsewhere should ensure that the process of learning is purposefully embedded within the structures, procedures and practices that are promoted to facilitate policy implementation, rather than being left to chance.

Key words: Policy evolution, floods, disaster management, South Africa

Introduction

If we have a better understanding of how and why policy evolves, then the potential is there to influence that process by steering that evolution towards more socially appropriate and sustainable measures.

In the flood risk management (FRM) field, Johnson and her colleagues developed a

framework, drawing on a range of policy evolution ideas, specifically analysing flood risk management policy evolution in Britain and in Bangladesh (Johnson et al., 2005; Penning-Rowsell et al., 2006; Sultana et al., 2008). That framework contrasted the influence of ‘catalytic’ change with intervening ‘incremental’ change – an analysis of the latter subsequently deepened by Lane et al. (2013) – and sought to demonstrate the importance of taking advantage of ‘windows of opportunity’ to put in place interventions towards better flood risk management.

This paper describes research in South Africa using the same framework. We adopt this approach because Johnson’s framework seeks to explain policy change; the relevance here is that we wish to explain and therefore better understand such change in FRM – as we achieved, we believe, in Britain and Bangladesh – in the very different South African context. However whilst Johnson’s catalytic events were major national floods, in South Africa the catalytic event of supreme importance in the last 25 years has been the ending of apartheid in 1994. Through document research and case studies we explore the process of flood risk management policy change in South Africa, using this framework, and draw out implications for both the relevant South African policies and the continuing validity of the theoretical framework put forward by Johnson and her colleagues.

Ideas concerning policy evolution

There are numerous theories that seek to explain the policy development process and hence the evolution of policy in society (e.g. Kingdon, 1984; Sabatier & Jenkins, 1981; Baumgartner & Jones, 1993). In our research it is recognised that each of these theories on public policy evolution has strengths and weaknesses. It is unlikely that one policy theory will ever dominate; therefore an integrated approach or framework is preferable (Johnson et al., 2005). “At its heart, the framework argues that the policy process is one of relative stability, ‘punctuated’ by times of rapid change” (Johnson et al., 2005, 564). The framework uses notions of incremental and catalytic change (from Baumgartner’s Punctuated Equilibrium theory (Baumgartner and Jones, 1983) where local floods bring about incremental change but catalytic change can also arise, driven by national-scale flooding. In addition, incremental change can also result from paradigm shifts in thinking on flood risk management and its practices (Lane et al., 2013). “Punctuation is primarily brought about by flood events which, if national in nature, offer a ‘window of opportunity’ to increase the rate at which policy changes, the range of actors involved and the number of issues negotiated” (Johnson et al., 2005, 564). Such policy ‘windows’ are widely described as opportunities for actors to push their ‘special interests’ into the public policy space (Kingdon, 1994). However, these actors do not necessarily determine change: there are numerous contextual factors as well as a variety of actors which will effect this change (Penning-Rowsell et al., 2006) both in the aftermath of flood crises and also during the intervening periods (Lane et al., 2013).

This process can also be modelled from Sabatier’s Advocacy Coalitions theory, where “policy negotiation occurs between actors in competing coalitions who share similar beliefs and values, which then translate into core policy objectives and instruments” (Johnson et al., 2005, 565). During times of incremental change coalitions are influenced by both contextual factors and the established actors within the policy subsystem. This process may remain the same during catalytic events except that a national scale flood will enable more actors – ordinarily uninterested – to enter the policy space, allowing for more political traction and possibly the introduction of new ideas.

Much public policy research also theorises five stages in the policy cycle (Figure1), although

the stages do not necessarily occur linearly. We recognise that this staged approach is also over-simplistic, and has attracted criticism (e.g. Sabatier, 2007, 7), but we see its value here as giving some equality of emphasis to implementation as a crucial part of the policy process. Johnson et al.'s framework (Figure 2) does not include this phase: it receives little analysis in Johnson et al. (2005), although more attention, previously, in Johnson et al. (2004). The framework was perhaps never intended to be an evaluation of the implementation of particular policies, but rather just to illustrate how the implementation and outcome of policy promulgation over time might form the context for the next catalytic event. Moreover Johnson did not have Sabatier's (1987, 651) 10 year time span for analysing the implementation results from half the catalytic events she researched, so her framework's diagrammatic expression (Figure 2) does not show this policy process phase.

In contrast we seek to make implementation a more explicit part of Johnson's framework, by demonstrating here how the promulgation of South Africa's Disaster Management Act (2002), which includes flood policy, can be explained using Johnson's framework in its original form, but only until a certain point in this policy cycle. In this respect the framework is clearly relevant to South Africa, despite being developed and tested elsewhere, but it is not sufficient in this implementation aspect. We show that the Act is not sufficiently implemented and that after the policy became law the framework fails to target an analysis of the implementation or evaluation of that policy, both of which in our example are crucial to the reality of policy change. Based on this analysis we therefore suggest some revisions to the Johnson et al. (2005) framework, by adding an explicit implementation phase, and advocating the use there of the concept of 'policy orientated learning' that is espoused by Sabatier (2007) but not employed by Johnson in analysing her research results, which do not include the evaluation of policy implementation.

The Flood Evolution Policy Framework and South Africa's Disaster Management Act (2002)

The end of apartheid in 1994 made it necessary to reform legislation that was then in place in South Africa, given that the majority of the population had been largely ignored or marginalised in and by many pre-existing statutes. Thus the end of apartheid along with the major floods that occurred in the North East of the country in 2000 equate to catalytic events in the terms of Johnson's policy framework, and created a significant policy window within which the country's flood policy was changed along with numerous other laws. Alongside these catalytic changes were incremental changes due to regional flooding and contextual changes as South Africa emerged from isolation to become a fully-fledged member of the international community.

Contextual factors (see Figure 2)

South Africa needed to re-join the international community after years of isolation under apartheid; the "emergence of democratic South Africa in the international arena ... changed the country's status from pariah nation to an equal international player" (Vermaak and van Niekerk, 2004, 555). To this end South Africa incorporated internationally accepted ideas into its new laws. This is clearly illustrated by the inclusion of sustainability principles into numerous laws and the application of disaster risk reduction principles into flood risk management. "Sustainability is accepted internationally and in South Africa as the best possible means of addressing the imbalances caused by exploitative human-environment relationships" (Houghton, 2005, 418).

Before 1994 the dominant approach to disaster management in South Africa was reactionary

where post disaster rehabilitation was the primary risk management tool. The change in government, amongst other things, allowed for the introduction of new ideas into the political space. The “newly elected government moved away from the traditional thinking and adopted a new approach in line with global trends by integrating risk reduction methodologies into developmental initiatives” (Reid and van Niekerk, 2008, 245). The drive to incorporate new principles demonstrates a change in behavioural factors by policy makers, and the context of an acceptance of these principles provoked significant changes in the approach to policy making.

Catalytic events

Catalytic events provide windows of opportunity in which policy advocates can act in order to change policy or encourage greater interest and focus on a particular issue (Johnson et al., 2005). The catalytic events that drove the change in disaster management policy in South Africa was the end of apartheid in 1994, as indicated above, and the floods that occurred in February 2000. This flooding, in north eastern South Africa, was an event that garnered national and indeed international attention. Heavy rainfall was recorded in South Africa, Mozambique and Swaziland in February 2000, disastrous flooding followed causing loss of life, infrastructure damage and the hampering of economic and agricultural activities (Dyson and van Heerdan, 2001). It was reported that 84 people lost their lives, 300,000 people were left homeless, 88 rural villages were ‘cut off’ and there was over 1 billion Rand (US\$ 165m) in road infrastructure damages (Khandhlela and May, 2005).

These two happenings fit in with the framework in terms of major events creating a space for actors to change policy. However, the end of apartheid does not fit perfectly. According to Kingdon, “once a window opens it does not stay open long” (Kingdon, 1994, 164). The window to change legislation in South Africa was in reality opened indefinitely, or more accurately until there had been sufficient review and change to all legislative measures across all policy domains. In this sense the policy window we see here in South Africa operated at two levels. The end of apartheid provided the overarching opportunity and necessity to change legislation, and the flood events provided the momentum to force policy advocates to focus on the disaster management domain and to act within that space.

Incremental evolution

After the June 1994 floods in Cape Town the new Cabinet began to assess the country’s ability to deal with natural disasters (Vermaak and van Niekerk, 2004), with a measured process. In 1997 the Inter-ministerial Committee for Disaster Management was formed as well as the Interim Disaster Management Centre. The Centre was formed to address the immediate needs of the nation and consisted of representatives from ten national departments of central government.

Within the Interim Disaster Management Centre a group was formed from civil society which had an advisory role. Involving this large number of national departments in the discussion on policy change required an immense amount of coordination and negotiation. The primary issues negotiated during this period were the introduction of risk management methodologies into disaster management, the incorporation of sustainability principles, and determining what would be the most effective governance framework for policy implementation. After a Green Paper in February 1998 and White Paper in January 1999 the Disaster Management Bill was put out for public comment in early 2000. Through this process of negotiation, the Act as passed incorporates sustainability principles, disaster risk methodologies as well devolving power to the local level (Republic of South Africa, Department of Cooperative

Governance (2003); Humby (2012)).

Contextual, catalytic and incremental changes working together

The end of apartheid opened the policy window. The June 1994 floods in Cape Town (a regional scale flood event) served as a spark which drove reform in disaster risk management (Humby, 2012). Subsequently the Inter-ministerial Committee developed the Green and White Papers on Disaster Management (Republic of South Africa, Department of Constitutional Development, 1998, 1999) (Humby, 2012). These attracted significant public comment and constant review (the ‘problem domain’ within the framework in Figure 2), and although necessary this can stall the legislative process; there was evidence of this happening in South Africa. However the major flood in 2000 provoked the necessary reaction to push for legislative closure. Due to the flood, a conference was called by the National Council of Provinces in May 2000 to debate the final details of the Bill (Vermaak and van Niekerk, 2004). The Bill gained momentum, was tabled and approved by Cabinet in August 2001 and promulgated in January 2002 (Republic of South Africa: Department of Cooperative Governance and Traditional Affairs (2002)).

Up until the promulgation of the law, Johnson’s framework can therefore successfully explain the dynamics of policy change (as represented by the Disaster Management Act of 2002 clearly following ‘catalytic’ events) as it did in its development in Britain and generally in its subsequent ‘testing’ in Bangladesh (Johnson et al, 2005; Sultana et al, 2008). However, in relation to all five stages of the policy cycle (Figure 1), we see the implementation stage as having particular relevance here. Implementation puts the legislation and its policies into practice: policy success should be viewed as the successful implementation of that policy, not its initiation. In order for policy implementation to take place various complex and interconnected steps need to be taken; for example, funding must be allocated, personnel assigned and rules of procedure developed (Howlett et al., 2009). The framework promoted by Johnson et al. (2005) does not include policy implementation but focuses only on the dynamics that lead to flood policy change in the form of legislation or some other formal mechanism. To illustrate this point, we will now exemplify aspects of the flood situation in South Africa where, although there is now sound legislation in place, we suggest there is a clear implementation deficit.

Flood Risk Management in South Africa and the Implementation Deficit

South Africa is not generally prone to large and devastating floods but it would appear that more modest flood events, particularly in urban areas and among vulnerable communities, have become more frequent (Vermaak and van Niekerk, 2004). The consequences of flooding in South Africa include disruption to communication systems and potable water supply, road infrastructure damage, water services failure, property damage and loss of life (Humby, 2012). Indeed 1,068 people have lost their lives in 77 flood events between 1980 and 2010 (Zuma et al., 2012).

The Disaster Management Act of 2002 (DMA 2002) laid the current foundations for disaster management in South Africa and includes guidance on floods, droughts and fires. The DMA (2002) describes disaster management as “an integrated and co-ordinated process (for) preventing, reducing and mitigating the risk and severity of disasters, ensuring emergency preparedness, rapid and effective response to disasters and post-disaster recovery” (Republic of South Africa, 2003, 6). In addition, the post-apartheid national Constitution (1996) brought in a new paradigm where there was shift from the national centralised control of state run activities to a focus on more localised management. When the new Disaster Management Act

was promulgated, it accorded new powers to each of the national, provincial and local levels, but the “most important sphere for effective implementation of disaster management is local government where most operational activities relating to disaster management will occur” (Botha et al., 2011, 24).

The Act embodies a multi-disciplinary and multi-sectoral approach to risk management where there are three ‘pillars’ within its institutional framework (Table 1). In addition there are specific policy outputs which have been mandated: the Disaster Management Framework and Disaster Management Plans. Through these frameworks and plans, local government has the responsibility to assess communities at risk, integrate disaster management into local development plans, and carry out systematic disaster risk assessments for all large scale development activities (Republic of South Africa, 2003, 2005).

What is clear, therefore, is that South Africa has a comprehensive and progressive legal framework which should lead to successful and pro-active disaster management. However, in reality an implementation deficit persists, as the following examples will illustrate.

The floods affecting the Eden District Municipality

The Eden District Municipality falls within the Western Cape of South Africa, some 350km due east of Cape Town. The District experiences a variety of disaster challenges including flood, drought, and fires. The region has a stable local economy which includes agriculture, manufacturing and tourism (Faling et al., 2012). The city of George and its surrounding areas provide the economic hub for the region with a functional central business district node, suburban commercial nodes, and one large industrial area bordered by a railway network. The George economy is well balanced and diversified (van Niekerk, 2009, 34) and the topography of the area is dominated by a coastal plateau bordered by the Outeniqua Mountains on the one side and the coast on the other.

In recent years the area has become more susceptible to flash floods. “Ravines and built-up areas help to channel the strong run-off into dangerous areas causing flash floods leading to landslides, riverbank erosion, water pollution and damages (to) irrigation infrastructure” (Faling et al., 2012, 12; Templehoff et al., 2009). Furthermore, during this period the municipality has also experienced population growth as well as urbanization. This has “generated significant internal pressures on the capacities of both the natural environment and existing municipal services” (Eden District Municipality, 2009, 30). Any major disruption to the economy here can have dire effects for the region as a whole.

The area has experienced numerous floods throughout the 2000s, in December 2002/January 2003, December 2006/January 2007, and 2008 causing major disruption and widespread economic losses. Many of the abnormal weather events in the region have been as a result of ‘cut-off’ low weather systems, occurring when the low pressure element of a meteorological system becomes severed from the main circulation patterns, resulting in the low pressure remaining stationary in the same location. Cut-off lows “are associated with very strong atmospheric instability and powerful convection up-drafts” (South African Weather and Disaster Service Online, 3 February 2012). These lows have caused flooding in the region in both 2003 and 2006, and the economic losses in the 2006 flood event were estimated at R300 million, more than double the 2003 event (Eden District Municipality, 2009). The municipality faced flooding again in November 2007. The city of George received over 512 mm of rainfall in 24 hours (between the 19th and 24th of November 2007) with dams in the area exceeding their 100% water storage capacities. The Western Cape Government endorsed the District Municipality's decision to declare the event a local disaster. The flooding resulted

in “severe damage and losses to dams, municipal infrastructure, formal and informal housing, roads as well as agricultural land, equipment and crops” (Western Cape Government, 16 January 2008).

The damages from this type of severe weather events are illustrated in Table 2. But the situation is complex. First, not everyone is at risk: many of the poorest people in the area live in marginal locations, for example on steep hillslopes and flood plains, and have charged the government with not undertaking effective disaster management (Faling et al., 2012; Templehoff et al., 2009). The District municipality itself has recognised the adverse effects on its low income populations, not least because a large proportion of the at-risk communities include low income settlements sited below road levels thereby being exposed to dangerous runoff due to limited storm water capacity (Eden District Municipality, 2009).

Secondly, response was patchy. The Disaster Management Act stipulates that Disaster Management Plans must be developed and must be consistent with local Integrated Development Plans (Faling et al., 2012). However a review has indicated that numerous local governments had yet to undertake this process, leading to deficiencies in important flood prevention infrastructure, for example stormwater drains (Templehoff et al., 2009). Many municipalities had not yet developed appropriate contingency plans to deal with a serious flood event and had resorted to using generic plans. The George Municipality had a generic contingency plan for use in emergency events which was outdated and not consistent with the new Disaster Management Act. As a result, responses to warnings were often poor as local managers were unsure how to respond.

Finally, no adequate event assessment guidelines had been generated and therefore there was limited guidance on whether it was necessary to declare a local or provincial state of emergency (Templehoff et al., 2009), which has crucial consequences for emergency response and public safety. In summary it is evident that the response to severe weather events in the Eden District Municipality was inadequate at these times, when tested by serious floods, to ensure the safety of the population, and that the good practices that the Disaster Management Act had promoted were not adequately in operation to reduce the risk for the population affected and promote recovery after the event had occurred.

The widespread flooding in December 2010/January 2011

In December 2010 and January 2011 South Africa was affected by widespread floods resulting in damages totalling R1.1 billion (c. US\$9.2m) and 103 fatalities (Zuma et al., 2012). The flooding event was also felt in neighbouring countries: in Mozambique 13 people died, with many thousands displaced, and Botswana and Zambia were also on high flood alert (Conway-Smith, 2011). The affected areas in South Africa included Kwa-Zulu Natal, Free State, Northern Cape and the North West Province.

Part of the reason for the widespread flooding was, firstly, because it was as a result of both the Orange and the Vaal rivers receiving large amounts of rainfall at the top of their catchments and its volume was compounded by rainfall subsequently experienced along the length of the rivers. Moreover, secondly, the Vaal Dam in Gauteng (upper reaches) and Gariep Dam in the Free State (middle reaches) were both 100 % and 112% full respectively by the middle of January 2011 and so could not accommodate the additional rainfall which continued to fall along the Orange River catchment.

The combination of these factors, amongst others, resulted in flooding in the lower reaches of the Orange River in particular. For example, the Northern Cape (lower reaches) experienced heavy flooding. The floodplains of the Orange River in the Northern Cape are prime areas for

growing cotton, grapes and other high value fruit crops. Vast swathes of land in this region were completely inundated. This had particular local and regional economic impacts as the flood occurred just before the harvest season. The Northern Cape has a pronounced seasonable employment pattern and without this type of harvest related work many people were not employed that season, leading to negative impacts on the local population.

The South African government declared eight of the nine provinces in South Africa disaster areas and at the time estimated flood damage could cost as much as R2 billion (US\$17m) (Conway-Smith, 2011; Stolley, 2011), although these estimates could be inflated as they were reported only days after the flood event. The R2 billion was divided equally between losses to agricultural land and damage to infrastructure while it was also estimated that 13,000 houses were damaged, mainly in informal settlements. Other damages across the country that were reported included disruptions to water treatment works, damage to water pumping infrastructure and health hazards. There was particular concern for outbreaks of cholera and livestock related diseases. The US National Aeronautics and Space Administration Earth Observatory reported at the time that this was one of the worst floods the region had witnessed in a decade and Southern Africa could face a serious food security crises as a result (National Aeronautics and Space Administration Earth Observatory, 15 February 2011).

The government was criticized for its lack of preparedness for the flood event. The Global Post Online reported at the time that “The South African government, criticized for being poorly prepared to deal with the heavy rains, announced Thursday that it had stepped up its humanitarian efforts, including increased coordination with local authorities, to help people affected by the floods and to “minimize loss of lives” in further flooding” (Conway-Smith, 2011). Exemplifying this extra assistance, the government released millions of Rands in aid through numerous emergency relief funds.

This might be seen as adequate response but it hides the underlying problem and reverts back to the historic approach of dealing with disasters only after they occur. The DMA (2002) had made specific provisions on integrating disaster management with the management of local authorities and yet there was and is still little understanding of the risks that flooding presents (Zuma et al., 2012).

The government’s response was clearly reactive, contrary to the proactive strategies espoused in the DMA (2002). Furthermore, the floods in the lower reaches of the Orange River (Northern Cape) were partly as a result of the heavy rainfall further up the catchment in Gauteng (which occurred some days before the flooding in the Northern Cape). Therefore, the government, in theory at least, with proper disaster risk reduction plans place, should have been more prepared to deal with flood event. However, even though nine years had passed since the DMA (2002) came into law, at the time of these widespread floods in 2010/2011 some 50% of South Africa’s local municipalities did not have the required disaster management structures in place, including 68 % of local and 25% of district municipalities that lacked the required disaster management advisory forums designed to promote public input or interest in disaster management (Botha et al., 2011). This has led to a lack of confidence in local governments adequately performing the duties assigned to them in the Constitution. For example, the Mail and Guardian newspapers reported that farmer unions were concerned that the roll-out of assistance to people affected by the 2010/2011 floods would be hampered by local government’s lack of capacity (Stolley, 2011).

Assessment

The above examples clearly illustrate an implementation deficit. There are numerous reasons

for the poor performance of local municipalities in emergency situations, which will differ between local governments. However we judge that there are some overarching and longer term generic issues which lead to difficulties.

Firstly, local governments are often faced with numerous issues on a day-to-day basis which require their immediate attention. Therefore they face a daunting task of trying to balance these pressing and immediate socio-economic challenges and introducing longer term factors into their planning – such as for disaster management - that will only pay off well into the future (Faling et al., 2012). Secondly, there is often a lack of human and political capital available locally to implement central government directives. The political motivation to provide the necessary resources and skills for disaster risk management are often lacking within local government, representing significant obstacles to progress (Templehoff et al., 2009). Policy implementation theory states that “bureaucrats are the most significant actors in most policy implementation” (Howlett et al., 2009, 160), but if the relevant staff are not available and equipped to deal with the issues at hand – including disaster risk management - then implementation will be an arduous task. Finally, there is often a lack of integration between the various levels of local and central government. The DMA (2002) requires a multi-disciplinary approach where all levels of government must work together to ensure adequate risk management, but there is evidence from our two examples to suggest that this did not take place in South Africa. More generally, Templehoff, et al (2009, 102) have concluded that the “lack of clear disaster risk management guidelines and procedures from National Government has in many instances caused an implementation bottleneck at local government level”.

The inability of various agents within government to perform the tasks required by legislation contributes significantly to any implementation deficit, and policy entrepreneurs must ensure that sufficient capacity exists to administer what changes they propose. During the policy formulation process steps should be taken to improve capacity further along in the policy cycle. In South Africa more attention should therefore have been given to the implementation aspects of the Disaster Management Act, not least because the 1999 White Paper on Disaster Management had already highlighted key elements and requirements (Botha et al., 2012, 22):

1. An effective and comprehensive disaster management strategy;
2. Coordination and clear lines of responsibility for those involved in disaster management;
3. Government capacity, particularly of local government in rural areas, to implement disaster management; and
4. Integration of civil society into effective disaster management activities, particularly those concerned with risk reduction.

As described by De Coning (2006) this concern also featured in the White Paper on National Water Policy for South Africa (National Water Act). In the Water Management Institutions section there (Part 5) it was specified that implementation requires significant institution building (De Coning, 2006, 526).

Adding an implementation phase to the policy change framework

Adding an implementation and an evaluation stages to Johnson et al's (2005) policy change framework is clearly necessary but there would need to be some caution in interpreting an analysis of the results, primarily because policy implementation can take some time to unfold and even to discern, and its absence early on should not necessarily surprise us.

Most policy cycles have a minimum duration of ten years, from the emergence of a problem through to sufficient experience with implementation to make a fair judgement as to the policy's relevance or effectiveness (Sabatier, 2007). However, one way to include an important element of this implementation in our policy analysis is through the concept of policy orientated learning, from Sabatiers' Advocacy Coalitions Framework (ACF). Sabatier and others believed a short time period (often, say, 4 years) was insufficient to assess any policy adequately and did not allow for the process of policy-orientated learning to unfold (Sabatier, 1986). Policy orientated learning is "the relatively enduring alternations of thought or behaviour intentions that result from the experience and/or new information and that are concerned with the attainment or revision of policy objectives" (Sabatier and Jenkins-Smith, 1999, 123). Essentially, this part of the process of implementation thus facilitates changes in behaviour and beliefs towards a policy. "Over time, objectives are clarified; research results in more adequate causal theories; and supportive constituencies (are) fostered at both the state and local levels" (Sabatier, 1986, 36). Thus, through policy learning (as part of implementation), proponents discover deficiencies and develop strategies to deal with them, perhaps changing the policy *en route*: it is acknowledged that this process is open to both negative and positive feedback loops.

The second issue here relates to how this affects the actual process of implementation. The "capacity of policy orientated learning to bring about belief and policy change has been hypothesised to vary depending on the level of the ACF's belief system" (Sabatier, 2007, 198). The ACF has three categories of beliefs: deep core beliefs and policy core beliefs, which are normative and thus very difficult to change, and secondary beliefs which have a relatively narrow scope and require less evidence to influence any such belief and are therefore more susceptible to change (Sabatier, 2007). Wiess (1977) believes that changes in fundamental and core beliefs require external perturbations while policy orientated learning may take 10 years or more to change secondary beliefs. The specific details of the ACF's beliefs system are not pertinent here, but this aspect of the ACF illustrates two points. The first is that implementation will be difficult if the policy requires a fundamental shift in the behaviour and beliefs of bureaucrats, and, secondly, that this aspect of policy evolution takes time.

The lack of implementation of the DMA (2002) can be attributed to a variety of factors, noted above, including limited funding, weak political will, lack of capacity and understanding of the Act, limited power allocated to management bodies and poor coordination between governance levels (van Niekerk, 2014). The lack of understanding, skills and capacity deserve particular mention here for a number of reasons. Firstly, it is a common issue in developing countries where poor governance persists (Botha et al., 2011), and where bureaucrats and civil servants play a crucial role in the implementation of policies (Howlett, 2009), and it is particularly relevant, secondly, for the DMA (2002) in South Africa as disaster management was being devolved to various levels all with specific mandates and requiring high levels of coordination between large numbers of personnel at local, provincial and national levels.

As noted above Sabatier describes how implementation can be affected by the belief systems of the managers implementing public policy. Our research did not pursue the belief systems of bureaucrats executing the DMA (2002) in South Africa and changes here for individuals. However we do have evidence from a review of the Act in 2010 that indirectly indicates that there has been a lack of knowledge of disaster risk methodologies and, as a result, a reversion to previous management techniques that hampered innovation. Van Niekerk (2014), in a critique of the DMA (2002) and its Policy Framework, indicates that a "the lack of disaster

risk reduction understanding is a constraint in the implementation of the disaster risk management policy and legislation” (van Niekerk, 2014: 869). Usefully, also, Botha et al.’s (2011) report on the assessment of disaster management in municipalities in South Africa demonstrates that the addition of the prevention and mitigation strategies into disaster management in South Africa was hampered by the fact that the target responsible staff are often former policemen, firemen and emergency medical professionals. “All of the professionals are response orientated, and the appointed staff often apply their naturally inclined response to their new function as ‘disaster risk managers’” (Botha et al., 2011, 54). Botha et. al. (2011) concluded, therefore, that the inability of the disaster managers to fully comprehend the DMA (2002) in conjunction with difficulties in learning new risk management techniques severely impacted the implementation of the Act.

If the disaster management approaches of the relevant managers can be described as based on secondary beliefs within the ACF system then they are open to change with policy orientated learning, although Wiess’s (1977) 10 years are pertinent here. Again, we have here to rely on an indirect approach, rather than research on secondary beliefs directly, in that we see that there was increasing acknowledgement in the disaster management and political communities some ten years after the promulgation of the Act that revisions needed to be made. In light of this an amendment Bill was tabled and the public was able to make comments up to the end of July 2013. Thus we judge that, through policy orientated learning, deficiencies in the previous policy had been identified and an amendment Bill drafted in order to rectify these problems. The amendments cover a range of issues and the following proposed changes are relevant here:

- “The Bill seeks to amend the definitions to be in line with the definitions used by the International Strategy for Disaster Reduction and make the Act simple and easy to understand” (Disaster Management Institute of South Africa, 2 July 2013).
- “(The Bill seeks to) Expand the contents of disaster management plans to include conducting disaster risk assessments for functioning areas, mapping of risk, areas and communities vulnerable to disasters” (Parliamentary Monitoring Group, July 2013).
- The “Bill aims to empower local municipalities, address matters of risk reduction and it also seeks to strengthen accountability and reporting on the implementation of policy and legislation relating to all aspects of disaster management across the spheres and sectors of government” (Disaster Management Institute of South Africa, 2 July 2013).
- “(The Bill seeks to) Provide for regulations on disaster management, education and training matters” (Parliamentary Monitoring Group, July 2013).

Therefore deficiencies in the Act and in particular the implementation deficit is acknowledged and it is expected that changes to the Bill will enhance implementation. Details of exactly how the implementation deficit would be tackled will become clearer once the amendment bill is finalised and once regulations have been drawn up. However, the amendment Bill as it stands gives some indication of how implementation would be tackled and improved. Firstly, it re-affirms the devolution of power to the local level. Local and district municipalities will still hold primary responsibility for creating and implementing Disaster Management Plans. Secondly, the Bill recommends that municipalities have to submit quarterly progress report to municipal and provincial intergovernmental forums on the implementation of policy and legislation relating to disaster risk reduction in municipalities (Republic of South Africa, 2013). Increasing the awareness of implementation through monitoring and reporting structures is a positive step as it will be easier to identify poor

progress and set benchmarks moving forward. However, this is no panacea: due to the seasonal, unpredictable nature of disasters as well as the pressure of more immediate socio-economic issues municipalities may find it difficult to report on these issues accurately and regularly.

Thirdly, the amendment states that each state agency included in the disaster management framework must submit a Disaster Management Plan (Republic of South Africa, 2013). More importantly this plan must include a Disaster Risk Assessment for the area in question and the implementation plans across the different parts of the state's governance systems must align. Moreover, the amendment requires specific steps to assess communities at risk from disasters, including obligations to

- map risks and communities vulnerable to disasters;
- provide measures and indicate how .. the .. state will invest to reduce the risk of disaster; and
- develop early warning systems and procedures for risks identified.

The above measures attempt to institutionalise a response to disaster risk into proactive measures for disaster management, thus reducing the propensity for the response-orientated nature of management. Finally, each "local municipality must establish capacity for the development of and coordination of a disaster management plan and implementation of a disaster management function for the municipality" (Republic of South Africa, 2013, 13). Given the lack of capacity at the local level identified earlier this is a step in the right direction, although it was not specified whether the capacity should be specifically include disaster risk skills.

Public comments for the Bill were closed in July 2013. A statement on the Cabinet meeting of 17 September 2014 indicated that Cabinet has approved the tabling in Parliament of Disaster Management Amendment Bill, 2002 (Act No. 57 of 2002). Therefore cabinet will vote on the proposed Bill in 2015 (although no date has yet been set), and further review of both the original and the amendment bill (if finalised) will be revealing vis-à-vis its implementation as it moves through the promulgation process.

Summary and conclusions

We would contend that better flood risk management policies come in part from a better understanding of how policy can change, and the drivers of that change.

In this regard we have found that the policy evolution framework promoted by Johnson et al.(2005) and developed in Britain is a useful framework with which to analyse flood risk policy evolution, and through its emphasis on 'catalysts' is able adequately to explain the promulgation of South Africa's Disaster Management Act (2002). We believe that this adds significantly to the value of the framework, complementing its wider applicability as revealed by research in Bangladesh (but with some key local differences there related to donor interventions (Sultana et al, 2008)).

However, our South African research shows that the framework does not take into account the all-important implementation aspect of the policy cycle which we see as a key component in ensuring policy success. Flooding in the Eden district Municipality and the flood event of the December 2010/January 2011 in South Africa have been used as examples here to illustrate the implementation deficit there, which we and others judge has hampered the advancement of disaster risk management in South Africa since 2002 by retaining a backward-looking reactive approach rather than a forward-looking proactive stance.

We suggest that one way of including the implementation phase in the theory of policy evolution - as of our research in the South African context demonstrates is necessary – is through the Sabatier’s concept of policy orientated learning. This concept is based on the premise that beliefs, behaviours, and actions can change over time as individuals grapple with issues associated with policy implementation. In June 2013 (11 years after the original promulgation) a draft amendment Bill was published in South Africa, based on the relevant professionals learning that the status quo as a response to the 2002 Act was not leading adequately to innovative disaster risk management. The Bill addressed the need to improve on implementation as well as to foster the better integration of disaster risk elements into municipalities.

Further research on disaster risk management in South Africa or elsewhere would be needed to understand the precise mechanisms whereby the relevant belief systems change during flood policy implementation, rather than relying on the kind of indirect evidence that we present on revisions to the Disaster Management Act 2002. However in the meantime it is clear that the policy evolution framework needs to extend beyond the policy promulgation change processes that Johnson correctly identifies, and that it can start to do this with an emphasis on identifying and analysing the process of learning as perhaps the initial element in the process of full policy implementation and its evaluation (Figure 3). We also conclude that any future flood policy change in South Africa or elsewhere should ensure, for successful policy implementation, that the process of learning is embedded within the structures, procedures and practices that are promoted, rather than being left to chance.

References

- Baumgartner, F.R. & Jones, B.D. (1993). *Agendas and instability in American politics*. Chicago, University of Chicago Press.
- Botha, D., van Niekerk, D., Wentink, G., Coetzee, C., Forbes, K., Maartens, Y., Annandale, E. Thona, T. & Raju, E. (2011). *Disaster Risk Management Status Assessments at Municipalities in South Africa*. Potchefstroom, SA, African Centre for Disaster Studies, North Western University.
- Conway-Smith, E. (2011). South Africa: Floods kills 120 and Destroy Crops, *Global Post*, 29 January 2011. Accessed at: <http://www.globalpost.com/dispatch/south-africa/110127/south-africa-floods-natural-disaster> (23/08/2014)
- De Coning, C. (2006). Overview of the water policy process in South Africa. *Water Policy*, 8, 505–528.
- Disaster Management Institute of South Africa. (2013). *Reminder to comment on Disaster Management Amendment Bill*, 3 July. Accessed at: <http://www.disaster.co.za/index.php?storytype=1&storyid=63&id=1&storyaction=viewstory&groupname=DMISA-News> (24/08/2014)
- Dyson, L.L & van Heerden, J. (2001). The heavy rainfall and floods over the north eastern interior of South Africa during February 2000. *South African Journal of Science*, 97, 80-81.
- Eden District Municipality. (2009). *Revised Integrated Development Plan 2008/2009*. George, SA, Eden District Municipality.
- Faling, W., Tempelhoff, J.W. & van Niekerk, D. (2012). Rhetoric or action: Are South African municipalities planning for climate change? *Development Southern Africa*, 29, 242-257
- Gaillard, J. & Mercer, J. (2012). From knowledge to action: Bridging gaps in disaster risk reduction. *Progress in Human Geography*, 37, 93–114. doi: 10.1177/0309132512446717

- Humby, T. (2012). *Analysis of legislation related to disaster risk reduction in South Africa*. Geneva, International Federation of Red Cross and Red Crescent Societies.
- Houghton, J. (2005). Place and the implications of the local for sustainability: an investigation of the Ugu District Municipality in South Africa. *Geoforum*, 36, 418–428.
- Howlett, M., Ramesh, M. & Perl, A. (2009). *Studying Public Policy*. Toronto, Oxford University Press.
- Johnson, C.L., Tunstall, S.M. and Penning-Rowsell, E.C. (2004). *Crises as catalysts for adaptation: human response to major floods*. Final research report (marked “draft”), ESRC Environment and Human Behaviour New Opportunities Programme. London, Middlesex University Flood Hazard Research Centre, Publication No. 511.
- Johnson, C. L., Tunstall, S. M., & Penning-Rowsell, E.C. (2005). Floods as catalysts for policy change: Historical lessons from England and Wales. *International Journal of Water Resources Development*, 21, 561–575.
- Khandlhela, M. & May, J. (2006). Poverty, vulnerability and the impact of flooding in the Limpopo Province, South Africa’ *Natural Hazards*, 39, 275–287.
- Kingdon, J. (1984). *Agendas, Alternatives and Public Policies*. Boston, MA, Little, Brown.
- Kingdon, J. (2003). *Agendas, Alternatives, and Public Policies*, New York, Harper Collins Publishers.
- Lane, S.N, November, V., Landstrom, C. & Whatmore, S. (2013). Explaining rapid transitions in the practice of flood risk management. *Annals of the Association of American Geographers*, 103, 330–342.
- National Aeronautics and Space Administration Earth Observatory Online. (2011). Flooding in South Africa: Natural Hazards, Published February 15, 2011. Accessed: <http://earthobservatory.nasa.gov/NaturalHazards/view.php?id=49258&src=nha> (13/01/2013)
- Parliamentary Monitoring Group. (2013). *Disaster Management Amendment Draft Bill*. (n.d.) Accessed at: <http://www.pmg.org.za/calls-for-comment/disaster-management-amendment-draft-bill> (24/08/2014)
- Reid, P. & van Niekerk, D. (2008). A model for a multi-agency response management system (MARMS) for South Africa. *Disaster Prevention and Management*, 17, 244–255.
- Republic of South Africa: Department of Water Affairs and Forestry (1997). *White Paper on a National Water Policy for South Africa*. Pretoria, Department of Water Affairs and Forestry
- Republic of South Africa: Department of Constitutional Development. (1998). *Green Paper on Disaster Management*. Pretoria, Department of Constitutional Development
- Republic of South Africa: Department of Constitutional Development. (1999). *White Paper on Disaster Management*. Pretoria, Department of Constitutional Development.
- Republic of South Africa: Department of Cooperative Governance and Traditional Affairs. (2002). *Disaster Management Bill*. Pretoria, Department of Cooperative Governance and Traditional Affairs.
- Republic of South Africa: Department of Cooperative Governance. (2012). *National Urban Search and Rescue Framework*. Pretoria, Department of Cooperative Governance.
- Republic of South Africa: Department of Cooperative Governance. (2003). *Disaster Management Act*. Pretoria, Department of Cooperative Governance.
- Republic of South Africa: Department of Cooperative Governance. (2005). *National Disaster Management Framework*. Pretoria, Department of Cooperative Governance.
- Republic of South Africa: Department of Cooperative Governance. (2013). *Disaster Management Amendment Bill*. Pretoria, Department of Cooperative Governance.
- Penning-Rowsell, E.C., Johnson, C.L. & Tunstall, S. (2006). Signals from pre-crisis discourse: Lessons from UK flooding for global environmental policy change? *Global*

- Environmental Change*, 16, 323–339.
- Sabatier, P.A. (1986). Top-down and bottom-up approaches to implementation research: a critical analysis and suggested synthesis. *Journal of Public Policy*, 6, 21-48.
- Sabatier, P.A. (1987). Knowledge, policy-orientated learning and policy change. *Knowledge: creation, diffusion, utilization*, 8, 649-692.
- Sabatier, P.A. (1991). Toward better theories of the policy process. *Political Science and Politics*, 24, 147-156.
- Sabatier, P.A. (2007). The need for better theories. In: Sabatier, P.A. (Ed.), *Theories of the Policy Process*. 2nd edition. Colorado, Westview Press, pp 3-17.
- South African Weather and Disaster Service Online. (2012). *What is a cut-off low pressure system?* 3 February. Accessed at: <http://sawdis1.blogspot.com/2012/02/what-is-cut-off-low-pressure-system.html> (26/08/2014)
- Stolley, G. (2011) 'AgriSA: Flood damage more than R2-billion', *Mail and Guardian* 25 January. Accessed at: <http://mg.co.za/article/2011-01-25-agrisa-flood-damage-more-than-r2billion> (23/08/2014).
- Sultana, P., Johnson, C.L. & Thompson, P. (2008). The impact of major floods on flood risk policy evolution: Insights from Bangladesh. *Journal for River Basin Management*, 6, 339–348.
- Templehoff, J., van Niekerk, D., van Eeden, E., Gouws, I., Botha, K. & Wurige, R. (2009). The December 2004-January 2005 floods in the Garden Route region of the Southern Cape, South Africa. *Journal of Disaster Risk Studies*, 2, 93-112.
- van Niekerk, D. (2014). A critical analysis of the South African Disaster Management Act and policy framework. *Disasters*, 38, 858–877.
- van Niekerk, D., Templehoff, J., Faling, W., Thompson, L., Jordaan, J., Coetsee, C., & Maartens, Y. (2009). *The effects of climate change in two flood laden and drought stricken areas in South Africa: Responses to climate change- past present and future*. Pretoria, South African National Disaster Management Centre.
- Vermaak, J. & van Niekerk, D. (2004). Development debate and practice: Disaster risk reduction activities in South Africa. *Development Southern Africa*, 21, 555-574
- Viljoen, M.F. & Booysen, H.J. (2006). Planning and management of flood damage control: The South African experience. *Irrigation and Drainage*, 55, 83–91.
- Weiss, C. H. (1977). The enlightenment function of social science research. *Policy Analysis*, 3(4), 531-545.
- Welcome Trust. (n.d.). *What is Policy?* Accessed at: <http://www.welcome.ac.uk/Funding/Public-engagement/Engagement-with-your-research/Support-and-resources/Government-and-science-policy/WTS040421.htm> (28/06/2015)
- Western Cape Government. (2008). *Eden District to be declared as a Local Disaster Area*, 16 January. WCG: Cape Town. Accessed at: <http://www.westerncape.gov.za/news/eden-district-be-declared-local-disaster-area> (26/08/2014).
- Zuma, B., Luyt, C., Chirenda, T. & Tandlich, R. (2012). *Flood Disaster Management in South Africa: Legislative Framework and Current Challenges*. Konya, Turkey, International Conference on Applied Life Sciences: International Society for Applied Life Sciences (pp 127-132).

Table 1.
The institutional framework of the Disaster Management Act (2002)

Pillars	Members	Function
Intergovernmental Committee on Disaster Management	Cabinet members, Municipal Officials and government Members of the Executive Councils (the cabinets of the provincial governments)	Report to Cabinet on the coordination of disaster management among the spheres of government.
National Disaster Management Centre	Minister and government officials	Guide and coordinate all aspects of disaster management with provincial and local governments.
National Disaster Advisory Forum	Government officials, civil society, Non-Governmental Organisations and organised business.	Provides a platform for the involvement of civil society; Has an advisory role within the Intergovernmental Committee on Disaster Management.

Source: Constructed using information from (Humby, 2012; South Africa 2003; and Zuma, 2012).

Table 2.
Damage estimation of severe weather events in the Southern Cape, South Africa

Year	Date the event commenced	Duration	Precipitation (mm)	Damage estimation (South African Rand)
2003	24 March	2 Days	287	R250 000 000
2003	10 May	2 Hours	73	
2004	22 December	45 Minutes	243	R 23 000 000
2005	14 January	90 Minutes	90	
2006	1 August	3 days	378	R 712 000
2007	22 November	3 days	539	R1 069 000
2008	--	-	-	R8 000 000
Total Damages				R 2.062 billion

Source: Faling et al. (2012). Data from 2008 was not complete and is therefore cannot be included here.

Table 3.

The extent to which South African municipalities agreed or disagreed that they had “Enough knowledge of disaster risk management policy and legislation”. Source: Botha et al (2011).

	District municipalities (total = 231)	Metropolitan municipalities (total = 6)	Local municipalities (total = 46)	All municipalities
Totally agree	0.0%	0.0%	8.8%	6.0%
Agree	58.3%	75.0%	32.4%	42.0%
Not sure	8.3%	25.0%	8.8%	10.0%
Disagree	33.3%	0.0%	38.2%	34.0%
Totally disagree	0.0%	0.0%	11.8%	8.0%
Sample size	55	6	17	78
Respondents	36	5	12	53 (68%)

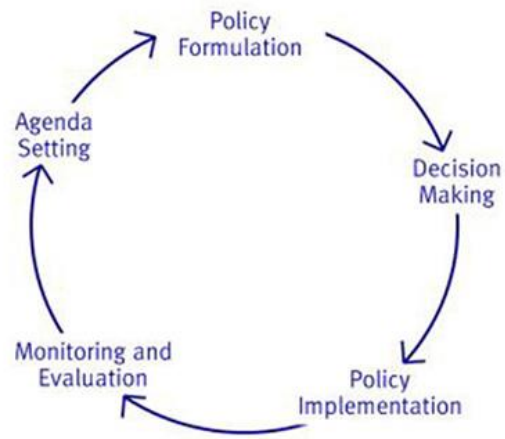
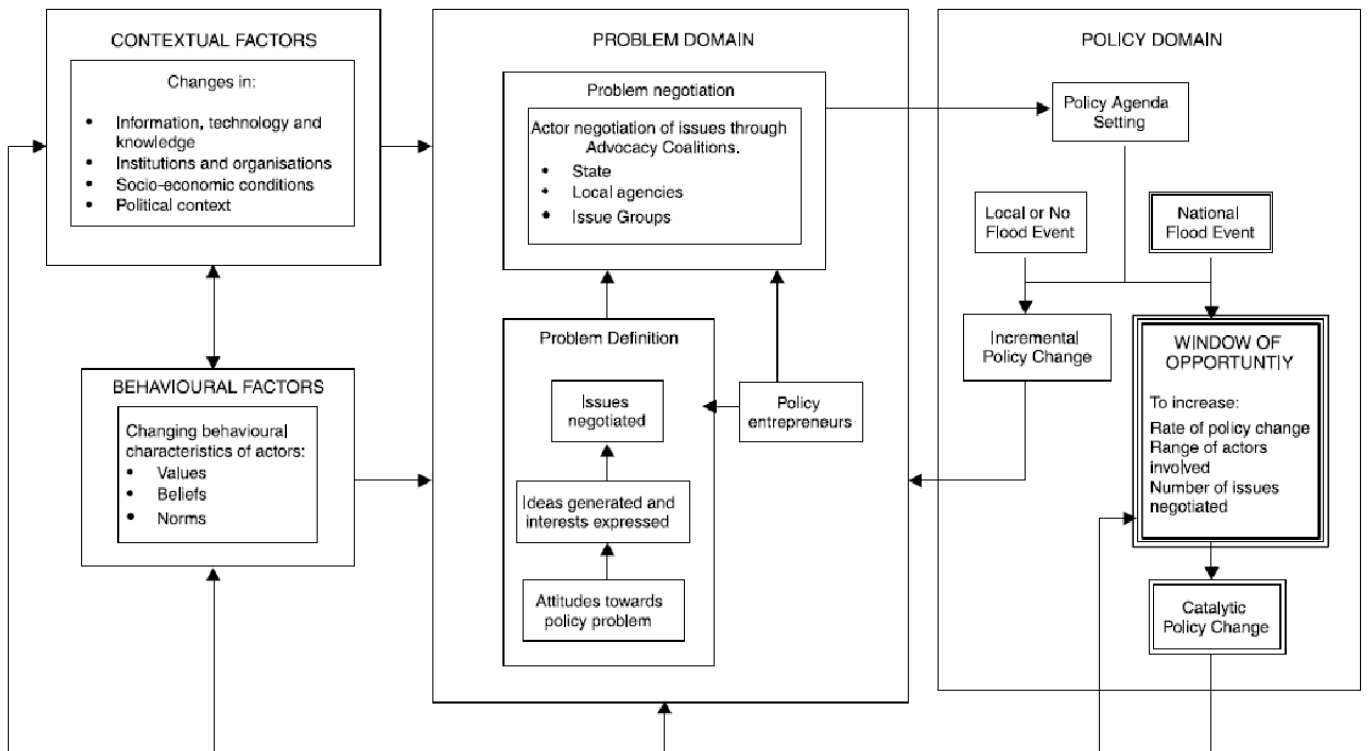


Figure 1:

The Policy Cycle, adapted from Howlett et al., (2009) and taken from Wellcome Trust (n.d.).

Figure 2:



Flood policy evolution framework taken from Johnson et al. (2005).

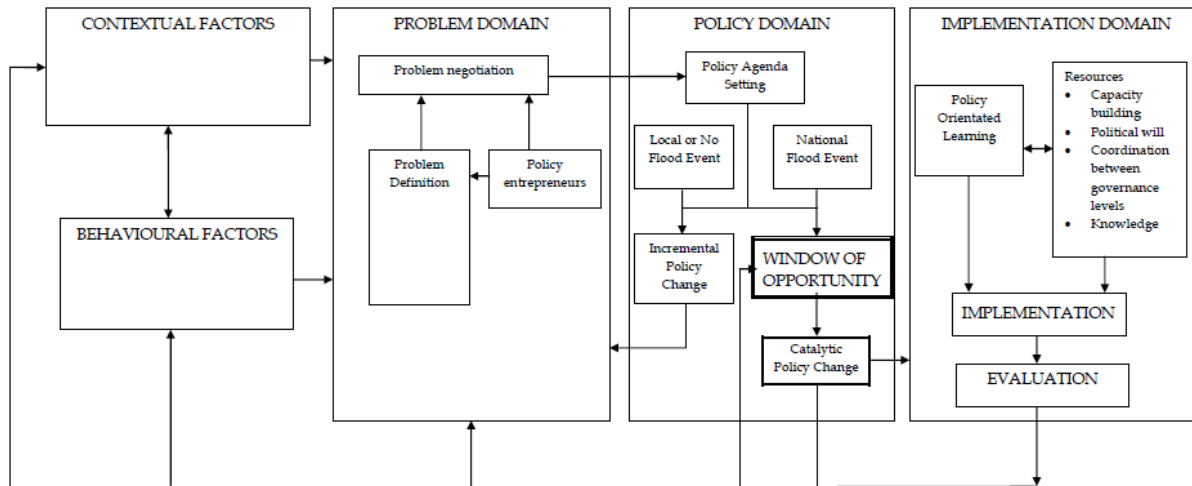


Figure 3:

A revised flood policy evolution framework. For simplicity some of the elements in Johnson et al. (2005)'s framework (as in Figure 2 here) have been abbreviated.